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Promises and Challenges of Biofuels for the Poor

Mark W. Rosegrant

Director

Siwa Msangi

Research Fellow

Environment and Production Technology Division

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Presentation Overview

- Biofuel Scenarios: Impacts on Food Security
- Macroeconomic Impacts
- Bioenergy and Rural Development
- Pro-poor Biofuels
- Policy Development

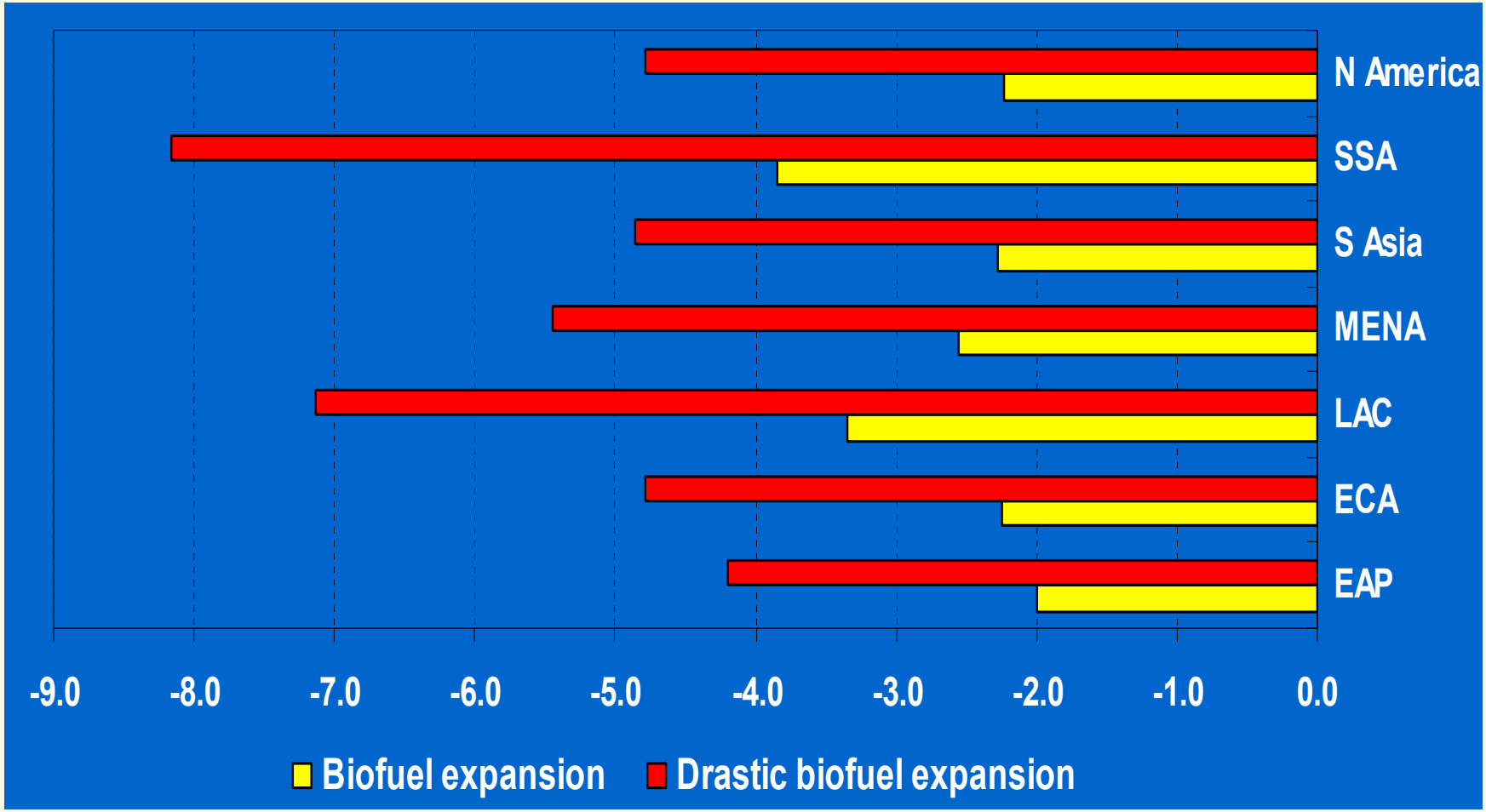
BIOFUEL SCENARIOS: IMPACTS ON FOOD SECURITY

http://earthyblog.com/joomla/images/62/biofuel.jpg

http://www.cosmosmagazine.com/files/imagecache/news/files/20070817_biofuel.jpg

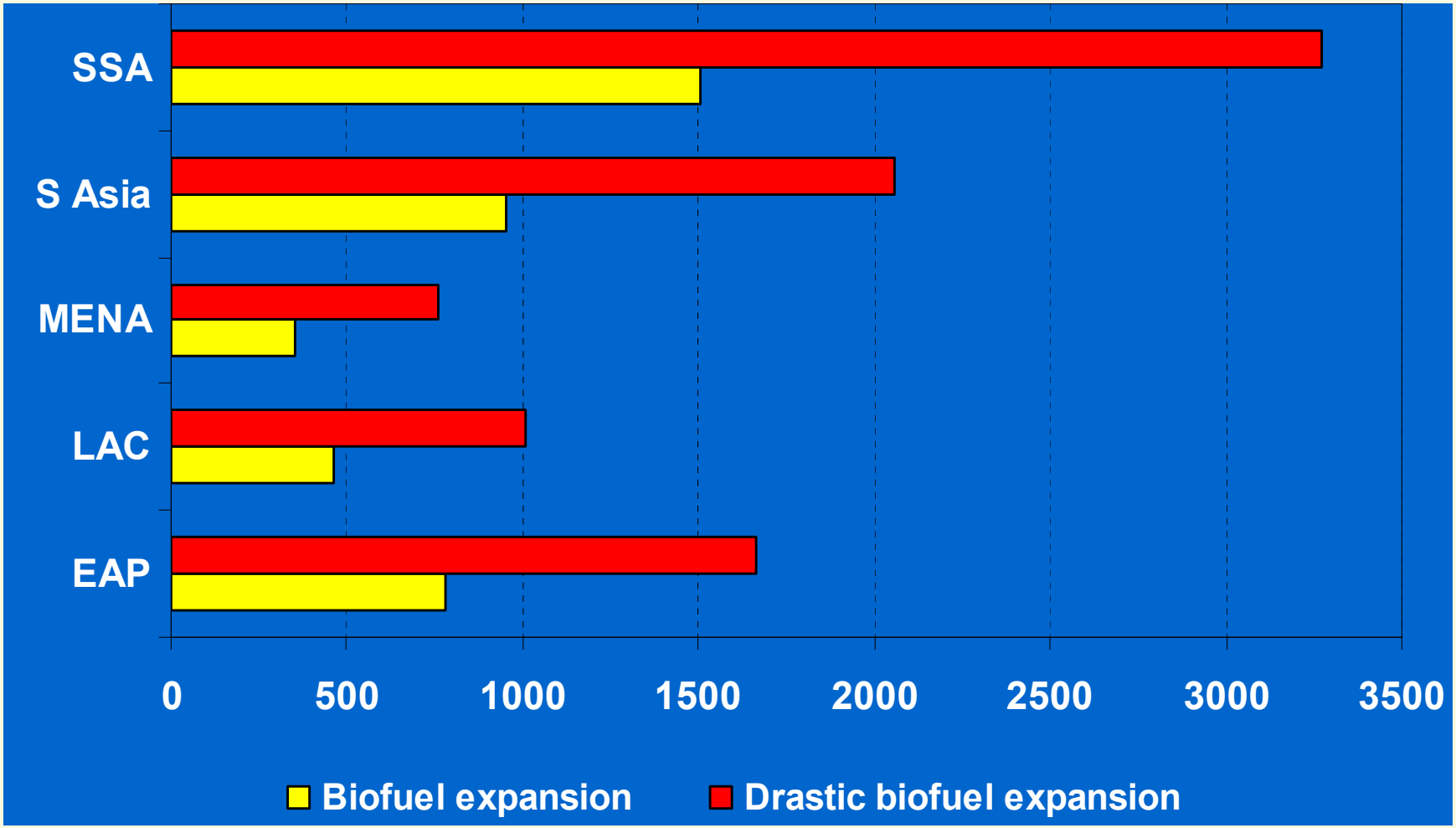
http://www.ead.ae/TacSoft/images/news/Biofuel%20Land%20Demand%20Puts%20Peasants%20at%20Risk.jpg

Calorie availability changes projected in 2020 compared to baseline (%)



Source: IFPRI IMPACT projections

Changes of numbers of preschool malnourished children in 2020 compared to baseline (‘000)



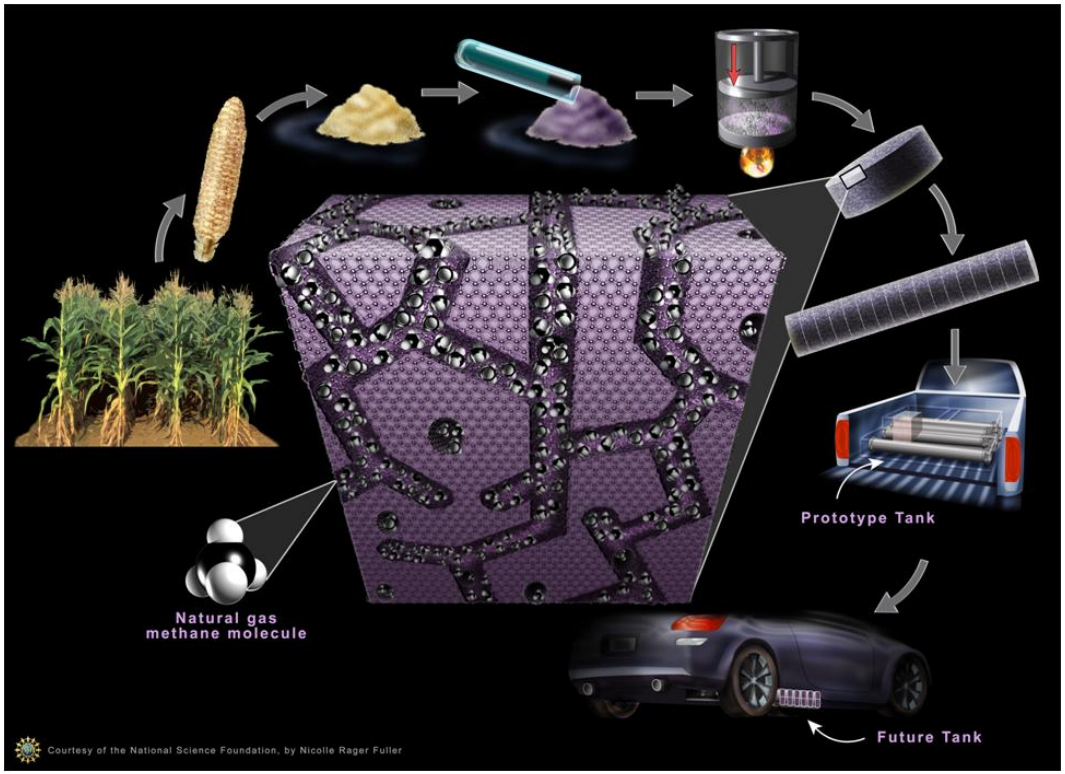
Source: IFPRI IMPACT projections

Change in agricultural value added, 2020, biofuel expansion compared with baseline (%)

Country/Region	Crops	Livestock	Total
Brazil	12.1	-8.8	8.9
China	6.7	-5.1	3.9
India	8.7	-2.9	6.6
USA	10.4	-8.3	4.4
SSA	8.3	-2.8	6.7
EAP	7.6	-5.0	4.8
ECA	5.2	-7.8	1.5
MENA	5.3	-5.6	2.7

Source: IFPRI IMPACT Projections

MACROECONOMIC IMPACTS



http://www.nsf.gov/news/mmg/media/images/carbon_biofuel_h3.jpg

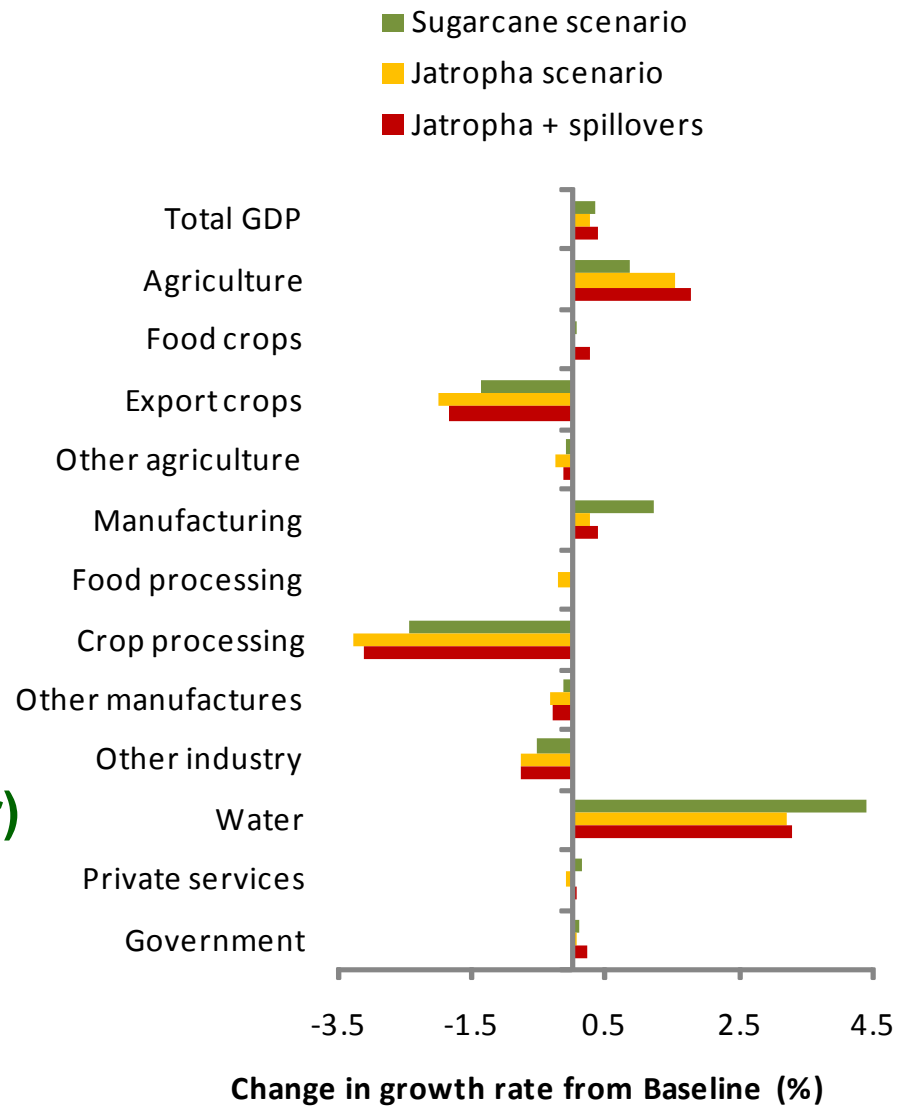
http://blog.wired.com/cars/images/2007/10/29/biofuel.jpg

Mozambique Scenarios

- Example from recent work done on Mozambique (University of Copenhagen, IFPRI and others)
- A food-insecure country that is scaling up export-oriented biofuels production
- Some key trade-offs to consider – since Mozambique is land rich but labor scarce
- Study considered 5 scenarios (baseline included) – that look at ethanol from plantation-based sugarcane and biodiesel from Jatropha (based on out-grower scheme)
- Also with technology spillovers to food sector

Example: Mozambique

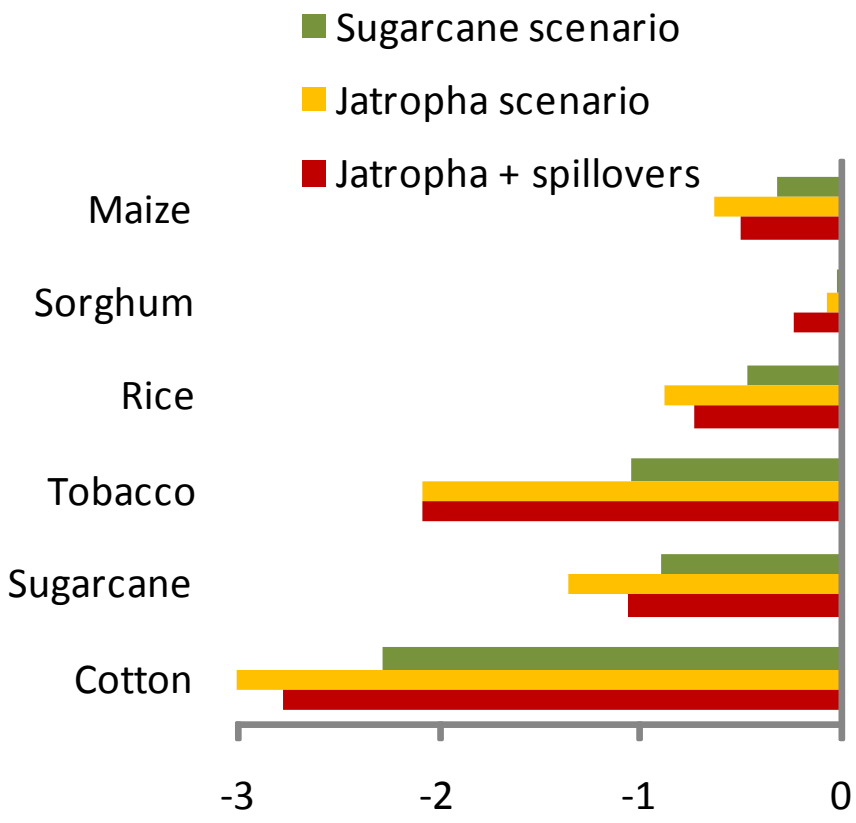
- Overall GDP growth rate: ↑ (new inflow of biofuel capital)
- Large ↑ in exports: +1% p.a.; ⅓ exports by 2015
- Real exchange rate appreciation (15%): ↓ traditional exports (-50%); ↑ food imports (+5%)
- Manufacturing expands due to biofuels processing; other subsectors decline (scarce labor)
- Small decline in food production (but increases with spillovers)
- Increased demand for biofuel inputs (e.g. water resources)



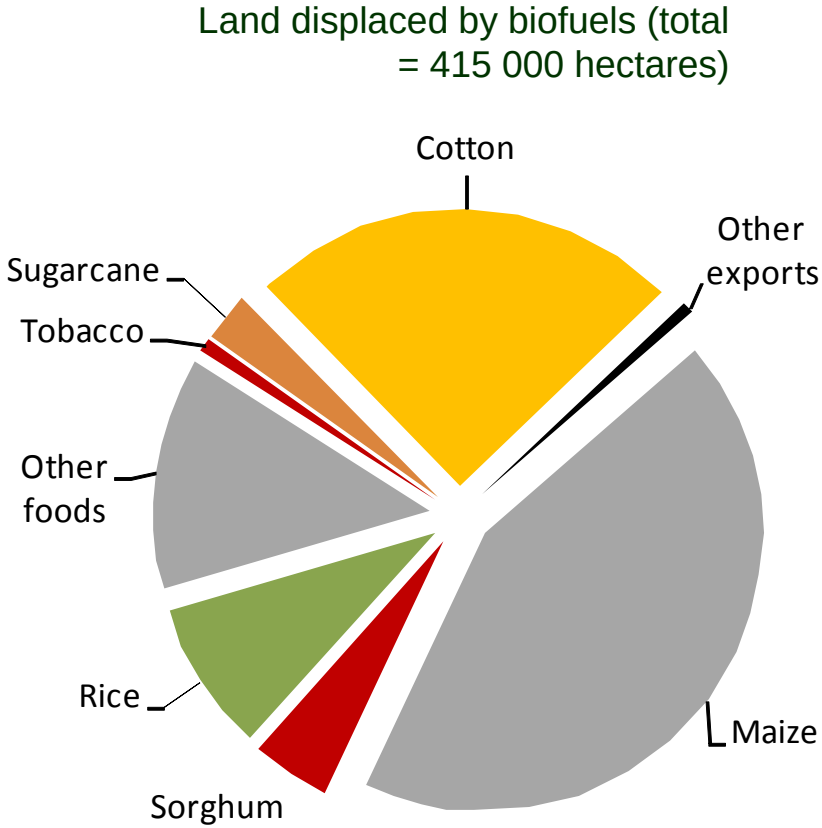
Source: Arndt et al. 2008

Mozambique: Agricultural Land use

Land allocated to export crops declines fastest…



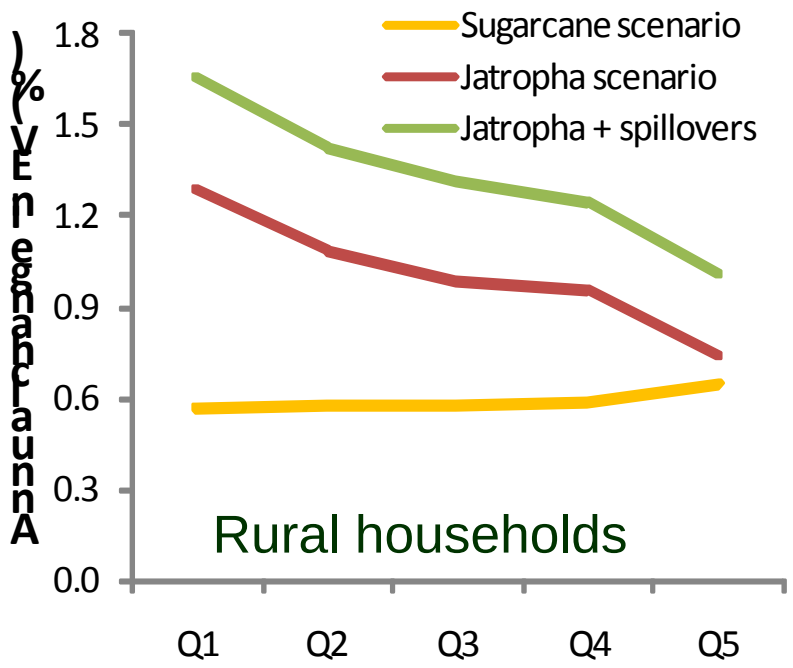
…but most displaced land comes from food crops

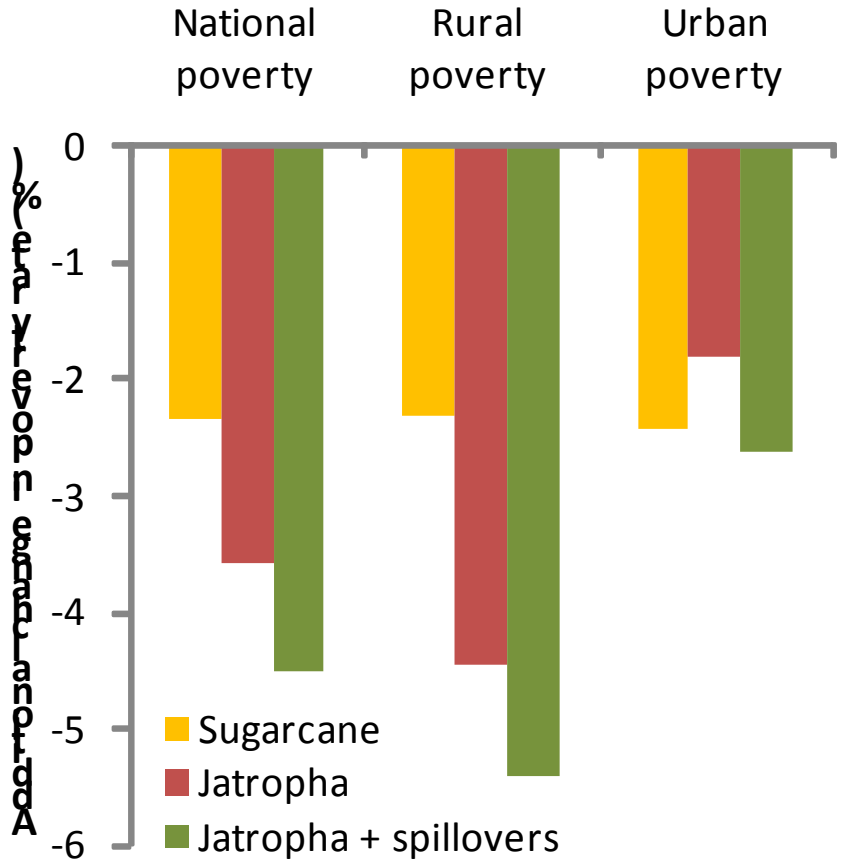


Source: Arndt et al. 2008

Mozambique: Poverty

- Biofuels investments reduce poverty (raises returns to land and labor)
- Jatropha out-grower scheme is more pro-poor (absolute and relative def.)
- Urban households benefit from processing and indirect jobs (raises semi-skilled wages)





Source: Arndt et al. 2008

http://www.unescap.org/unis/common/images/press/bio-energy1.jpg

BIOENERGY AND RURAL DEVELOPMENT

http://www.sustainablebuild.co.uk/images/1514.jpg

Opportunities for Pro-Poor Bioenergy

- Opportunity to use biofuel buzz to refocus on rural energy needs
- Pro-poor bioenergy could meet human needs
  - Cooking fuel
  - Heating and lighting
  - Water pumping
  - Power for health and education services
- Improved rural living standards - backbone of a long-term development strategy

Current Biomass Use

- Fuel wood, manure and other combustible residues are the most significant source of energy in many developing countries—over 90 percent of total primary energy supply for DR Congo, Tanzania, and Ethiopia (IEA 2005)
- This supply is unsustainable and there is a need to modernize rural energy sector

Energy Consumption of the Poor

- Share of energy expenditures are small, especially relative to food
- Bangladesh ($1/day poor)
  - Food: 66 cents
  - Energy: 9.3 cents

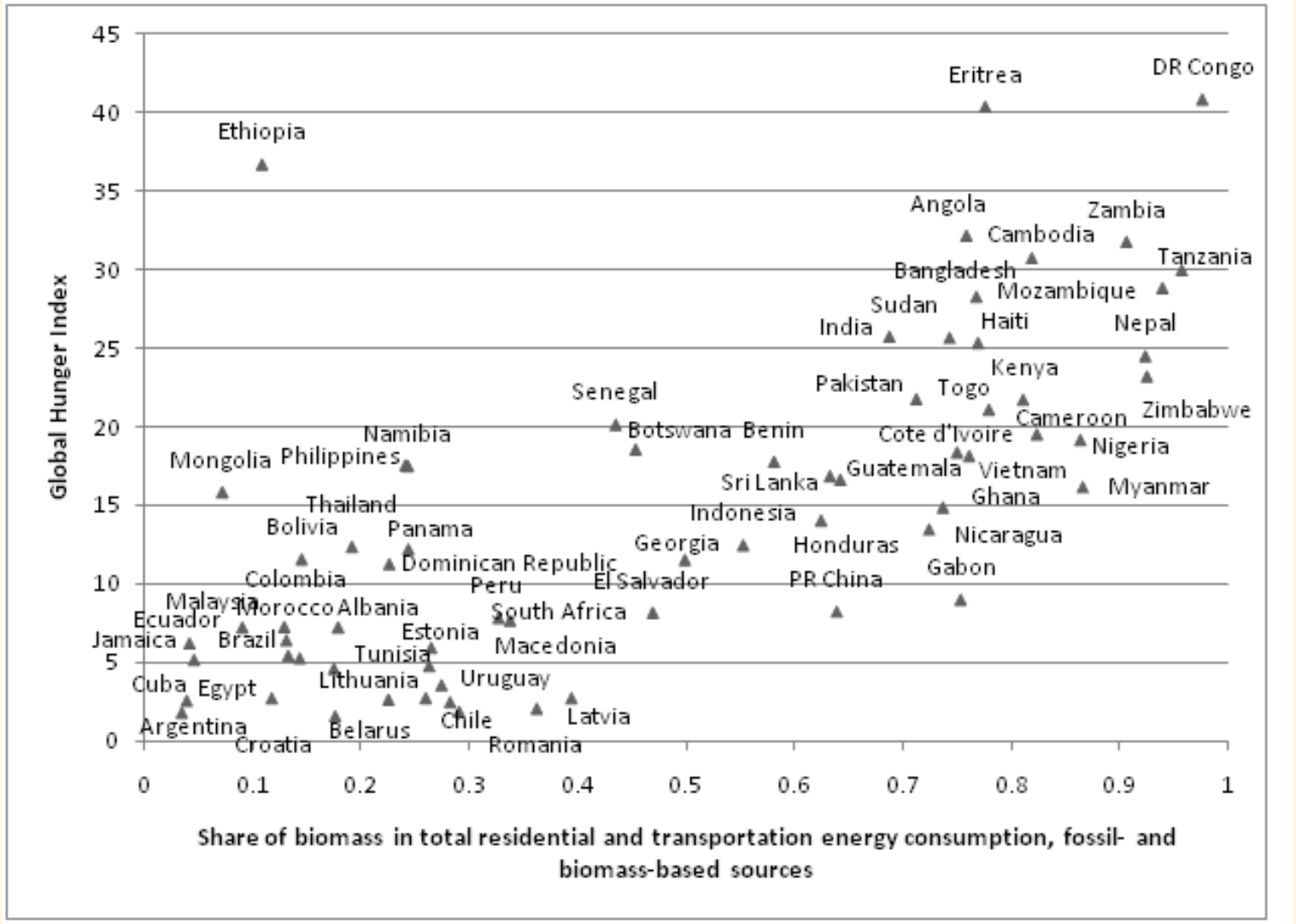
- But poor pay high opportunity cost
  - The collection biomass major time burden for women
  - Burning firewood indoors factor in female and infant mortality

Nexus of Bioenergy and Food Security

- In light of the impacts on malnutrition and hunger is it possible to use biofuels to meet rural energy demands and reduce poverty?
- High correlation between hunger and biomass dependence

Jatropha plantation in India

Global Hunger and Biomass Use



Proper Evaluation of Tradeoffs

- **Countries: Face a high bill for imported fuel, have relatively abundant land and low risk of conflicting with food security → better candidates for biofuel production**
- **Countries: high biomass use and heavy human cost of using biomass for energy → prioritize towards household uses**
- **In all cases, country specific conditions and priorities need to be evaluated**

PRO-POOR BIOFUELS

http://www.iconocast.com/00020/D9/News1_1.jpg

http://i243.photobucket.com/albums/ff314/biopact4/biopact_food_biofuels_malawi.jpg

http://naturalpatriot.org/wp-content/uploads/2007/09/jatropha_plants.jpg

Characteristics of Pro-Poor Biofuel Crops

- Productive on marginal or degraded landscapes
- Improved drought and heat tolerance
- High productivity of biofuel component (oil, starch, cellulose [in future])
- Perennial, but produce useful levels of yield quickly after planting
- Water and nutrient efficient, adaptation to low input levels
- Crop biomass (stems, leaves etc) useful for fuels
- Carbon storage in below ground plant parts

Guidelines for Pro-poor Biofuels

- Maximize smallholder participation
- Develop opportunities for value-added beyond biomass production
- Promote tenure security
- No additional conversion of natural habitats to agriculture
  - Increase intensification and efficiency of land that is in crops
  - Reclaim and restore production from degraded land, abandoned land, and highly eroded land
  - Consider competing uses of marginal and idle land - biomass forage and resources for the landless
- Ensure flexibility in food and energy production technologies to minimize risk
- Increase investment in research and development next generation technologies

Maximizing Smallholder Participation

- **Simple crops grown on marginal or degraded relatively poor lands**
  - **Low input costs**
  - **Inexpensive to refine in small-scale processing plants**
  - **Responsive to local energy needs (household electricity, clean cooking fuel, lamp oil, organic seedcake fertilizer, water pumping)**

Maximizing Smallholder Participation

- **Crops currently being developed**
  - Jatropha—well-suited for areas with low rainfall and low soil quality; piloted in a number of small-scale biodiesel development projects in Sub-Saharan Africa, India
  - Sweet sorghum—ideal for drier areas; similar properties to sugarcane in producing ethanol; less threats for food security due to declining demand as food; co-production value as a livestock feedcake
  - Pongamia—similar to Jatropha; found to produce over twice as much oil per hectare compared to Jatropha

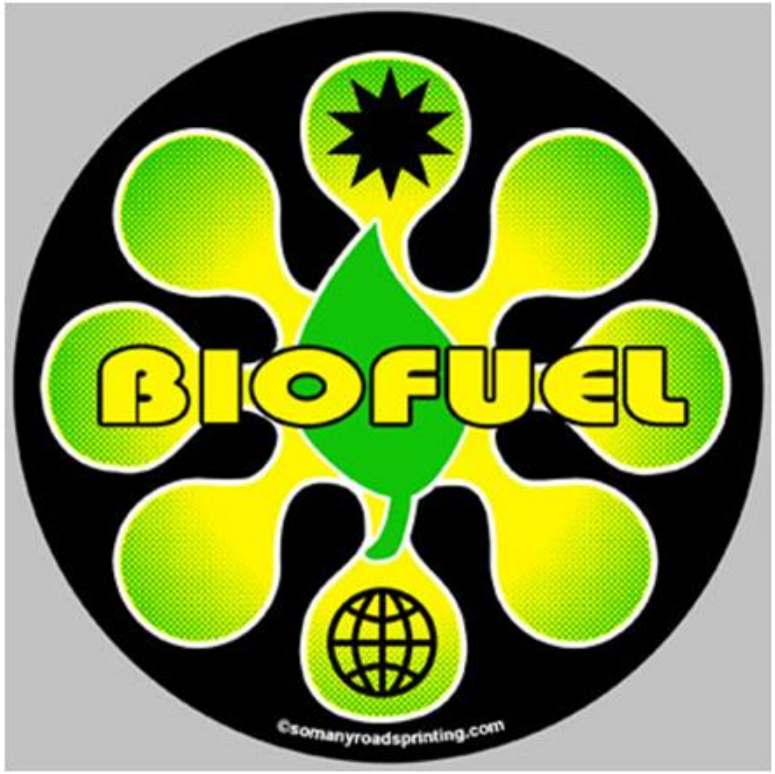
http://www.dcbroadcast.com/well/images/jatropha.jpg

http://thefraserdomain.typepad.com/photos/uncategorized/2007/06/18/sorghummilo_3.jpg

http://biofuelsdigest.com/blog2/wp-content/uploads/2008/06/flowering-of-pongamia-tree no9.jpg

POLICY IMPLICATIONS

http://dashofcalabash.grassrootinstitute.org/wp-content/uploads/2008/06/trevor11.jpg



http://www.somanyroadsprinting.com/html/graphics/stickers/large/biofuel/biofuel.logo.round.jpg

National Policy Initiatives

- Clear national policy and strategy towards energy—especially renewables—and how it intersects with other sectors, such as agriculture
  - Subsidies for out-grower schemes, green and local energy
  - Tax incentives for local refinement
- Maximize complementarities between public and private stakeholders
  - Ensure supply chains generate income and employment for small producers and laborers
  - Promote technology transfers
- Develop and enforce certification schemes and energy standards
  - Promote sustainable land use, secure land tenure, food security, biodiversity, and welfare
- Strengthen rural credit
- Partner with international organizations and CGIAR centers in crop research

At the Farm-level

- **Promote both on and off-farm research in crop development and information exchange**
- **Promote seed development**
  - **Establish local gene banks**
  - **Farmer-managed seed funds**
  - **Production and distribution of improved varieties**
- **Create markets**
  - **Seek to stabilize yields**
  - **Provide access to credit**
  - **Guaranteed supply and market**
- **Maximize synergies with ecosystem restoration in degraded areas**

Conclusions

- Impacts of global biofuel development and growth on rural poor
  - Likely to be mixed and farming system-specific – both positive and negative – warrants careful assessment
- Not necessarily a 'crowding-out' effect – there's room for complementarities and synergy
- Common set of conditions for promoting rural development and enhancing socio-economic growth and biofuel capacity
- Expand consideration of biofuels beyond transportation uses to take into account actual energy demand of the poor
- CORE BUSINESS: Should stay focused on rural socio-economic growth and development, agricultural research and productivity enhancement